

**INDIANA DEPARTMENT OF TRANSPORTATION  
MATERIALS AND TESTS DIVISION**

**ACCEPTANCE PROCEDURES OF AIR COOLED BLAST  
FURNACE SLAG FOR LEACHATE DETERMINATION  
ITM No. 212-02T**

**1.0 SCOPE.**

- 1.1** This method sets forth the procedure for sampling and testing ACBF slag for determination of leachate from the aggregate.
- 1.2** Unaged ACBF slag may contain an excessive quantity of calcium sulfide which may leach when inundated with a large volume of water. The leachate may emit hydrogen sulfide gas, and have a greenish-yellow color. When exposed to air, the rate of leaching will diminish with time as the ACBF slag ages. The aging process will allow the calcium sulfide to oxidize to sulfates and carbonates.
- 1.3** This procedure will apply to all uses of ACBF slag except for use in HMA or PCC.
- 1.4** The values stated in either acceptable English or SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore each system shall be used independently of the other, without combining values in any way.
- 1.5** This ITM may involve hazardous materials, operations, and equipment. This ITM does not purport to address all of the safety problems associated with the ITMs use. The ITM user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

**2.0 REFERENCES.**

**2.0 AASHTO Standards.**

M 92 Wire-Cloth Sieves for Testing Purposes  
M 231 Standard Specifications for Weighing Devices Used in the Testing of Materials  
T 248 Reducing Samples of Aggregate to Testing Size

**2.1 ASTM Standards.**

D 1193 Specification for Reagent Water  
E 70 pH of Aqueous Solutions with the Glass Electrode  
E 832 Specification for Laboratory Filter Paper  
E 960 Specification for Laboratory Glass Beakers

## **2.2 ITM Standards.**

### 207 Procedure for Sampling Stockpiled Aggregates

**3.0 TERMINOLOGY. Terms and Abbreviations.** Definitions for terms and abbreviations will be in accordance with the Department's Standard Specification, Section 101.

**4.0 SIGNIFICANCE AND USE.** This ITM will be used to evaluate ACBF slag for determination of leachate from the aggregate. The ACBF slag will meet the requirements of this test method before use, except when used in HMA or PCC.

## **5.0 APPARATUS.**

**5.1** Balance, Class G20, in accordance with AASHTO M 231

**5.2** No. 4 (4.75 mm) sieve, conforming to requirements of AASHTO M 92

**5.3** Filter paper, medium grade, conforming to requirements of ASTM E 832

**5.4** The Geological Society of America Rock Color Chart

**5.5** Five-gallon bucket, plastic, with lid

**5.6** Funnel

**5.7** Glass beaker, 150 mL conforming to the requirements of ASTM E 960

**5.8** pH meter

**5.9** Tamping rod, round, steel, approximately 5/8 in. in diameter, and approximately 24 in. in length.

**6.0 REAGENTS.** Deionized or distilled water, conforming to the requirements of ASTM D 1193

## **7.0 GENERAL REQUIREMENTS.**

**7.1** Each Aggregate Producer requesting to have ACBF slag tested in accordance with this procedure shall contact the appropriate District Materials and Tests Engineer to initiate the approval process.

**7.2** Sampling and testing shall be conducted by the Aggregate Producer.

**7.3** ACBF slag shall be sampled as the stockpiles are being constructed. Existing stockpiles shall be sampled randomly from the exterior and interior of the stockpile.

**7.4** Acceptance for use of ACBF slag will be given on each stockpile of approximately 2000 tons (2000 Mg). Stockpiles that do not meet the acceptance criteria of this test method may be tested again after 30 days from the test date.

- 7.5** Stockpile location, stockpile identification, and test results shall be maintained at the ACBF slag source and shall be available for inspection.

## **8.0 SAMPLING.**

- 8.1** Sampling of aggregates shall be done in accordance with ITM 207.
- 8.2** Each sample shall consist of 80 to 100 lbm (36 to 45 kg) of material.
- 8.3** The test sample shall be obtained by reducing the original sample in accordance with AASHTO T 248 to a sample size of 20 to 25 lbm (9 to 11 kg)

## **9.0 PROCEDURE.**

- 9.1** Place the test sample in a five-gallon bucket, fill with distilled or deionized water until the sample is covered with at least 1/2 in. (13 mm) and not more than 1 in. (25 mm) of water, and place the lid on the bucket. No additional water shall be added after the test is started. Allow the sample to soak for 1 day.
- 9.3** After the 1 day soaking period, thoroughly stir the sample with the tamping rod and collect a water sample of approximately 100 mL.
- 9.4** Using a funnel, filter the water sample through the filter paper into a glass beaker.
- 9.5** Observe the color of the water.
- 9.6** Calibrate a pH meter in accordance with the manufacturer's instructions and ASTM E 70, and then determine the pH of the water sample to the nearest 0.1 pH unit.
- 9.7** If the water color is equal to or darker than the moderate greenish-yellow color (Hue 10 y) from the rock color chart, or the pH is not within 6.0 to 10.5, the material is not acceptable and the test is completed. Upon the completion of the color observation and pH measurement, the 100 mL water sample is discarded.
- 9.8** If the water color is lighter than the moderate greenish-yellow color (Hue 10 y) from the rock color chart and the pH is within 6.0 to 10.5, then allow the sample to soak for another six days. The bucket shall be covered with the lid, and the sample stirred after three days and seven days of soaking.
- 9.9** Repeat steps 9.3 to 9.6 after three days and seven days of soaking.

**10.0 ACCEPTANCE CRITERIA**

- 10.1** If after 1 day, three days, or seven days of soaking, the water color is equal to or darker than the moderate greenish-yellow color (Hue 10 y) from the rock color chart, the material will not be acceptable for use.
- 10.2** If after 1 day, three days, or seven days of soaking, the pH is not within 6.0 to 10.5, the material will not be acceptable for use.
- 10.3** If after 7 days of soaking, the water color is lighter than the moderate greenish-yellow color (Hue 10 y) from the rock color chart and the pH is within 6.0 to 10.5, the material will be acceptable for use.

**11.0 REPORT.**

- 11.1** All pH values shall be reported to the nearest 0.1 unit.
- 11.2** The color of the water shall be reported as lighter than, equal to, or darker than the moderate greenish-yellow color (Hue 10 y) from the rock color chart.